**GBEP Working Group on Capacity Building**

**for Sustainable Bioenergy**

***Draft Proposal for an Activity Group on***

***Advanced Biofuels***

At the 8th Meeting of the Working Group on Capacity Building (WGCB) held in Rome on 1 December 2016, the Partners and Observers agreed that advanced biofuels was an area that GBEP should further explore. This short note has been prepared by the GBEP Secretariat, as was agreed at the meeting, in order to explore the potential for GBEP in this area and to highlight activities that could be carried out in a possible Scope of Work of a new WGCB Activity Group (AG). Discussions among Partners and Observers could be held electronically and, if considered appropriate, an Activity Group could be approved remotely and start working prior to the GBEP regular meetings in November 2017.

**Background**

In their most basic definition, “biofuels are energy carriers that store the energy derived from biomass”[[1]](#footnote-1). Biofuels are differentiated into primary and secondary types: primary are those that are principally used in their “natural form”, such as woodfuel, whereas secondary biofuels are processed fuels in either solid (e.g. charcoal), liquid or gaseous (e.g. biogas, syngas) forms[[2]](#footnote-2).

Within secondary biofuels, there is a further distinction drawn between first generation (conventional biofuels) and second or third generation (advanced) biofuels. This distinction can be made in four distinct ways, based on:

* **The type of feedstock used**. Advanced biofuels are produced from lignocellulosic material such as dedicated crops, grasses, municipal solid waste, and agricultural and forest residues (second generation biofuels) as well as from algae (third generation biofuels)[[3]](#footnote-3).
* **The type of technology used**. The IEA defines advanced biofuels as those which use “technologies which are still in the research and development (R&D), pilot or demonstration phase”[[4]](#footnote-4), as opposed to conventional biofuels, which use technologies that are well established at the commercial scale.
* **The amount of greenhouse gas (GHG) emissions savings** compared with fossil fuels. For example the Renewable Fuel Standard of the USA that includes the advanced biofuel standard, which is comprised of any biofuel that achieves at least a 50 percent reduction in lifecycle greenhouse gas emissions[[5]](#footnote-5).
* **The impact on the sustainability of agro-ecosystems.** For example, the European Union (EU) describes “advanced biofuels, [as those that] provide high GHG emission savings with a low risk of causing indirect land-use change, and do not compete directly for agricultural land for the food and feed markets”[[6]](#footnote-6).

‘Advanced biofuels’ is therefore the general term for all ‘second’ and ‘third’ generation biofuels, as well as those that may arise in the future. Examples of these biofuels are cellulosic ethanol, biobutanol, biomass to liquid (BtL), biodimethylether (bioDME) and pyrolysis oil (bio-oil), among others.

Biofuels are an alternative to fossil fuels for transport (e.g. road and aviation) and industry (through heat and electricity generation) that are intended to reduce the lifecycle GHG emissions associated with the production and use of fuel, whilst generating income and bringing development to generally less favoured rural areas. Bioenergy represents an important component of the energy mix of several countries, particularly developing ones, and demand for biofuels will grow in the future with expansion of the transport sector and improvements in biofuel technology[[7]](#footnote-7).

According to IRENA, bioenergy represents a major type of renewable energy. As such, it is key to supporting the UN Sustainable Development Goals (SDGs) in the context of climate change and energy security. As summarized by the IPCC 5th Assessment Report[[8]](#footnote-8), integrated assessment modelling indicates a high risk of failing to meet long-term climate targets without bioenergy. Therefore, the promotion of advanced biofuels, in addition to conventional biofuels, is a priority to meet ambitious GHG reduction targets as well as to meet SDGs. However, it should be noted that factors besides the difference between their conventional and advanced nature (e.g. land use, competition with food, production process efficiency, total energy balance, etc.) need to be taken into account across each specific value chain to ensure sustainability of biofuel pathways.

There are a number of technical and policy barriers that need to be overcome for advanced biofuels to fulfil their full potential. UNCTAD (2016) recognises the following barriers to the advanced biofuel industry: “high capital costs associated with production, stability and diversity of feedstocks, and low consumer demand associated with a lack of infrastructure for higher ethanol blended fuels”[[9]](#footnote-9). Policy support instruments are required to ensure that there is enhanced uptake of advanced biofuels technology at the commercial scale. These include tax exemptions, grants, blending mandates and subsidies, among others. Furthermore, it has been noted that regulatory certainty is required to maintain investment in the industry[[10]](#footnote-10).

**Scope for GBEP**

There are a number of international organisations and initiatives that are working in the field of advanced biofuels where collaboration could be promoted with GBEP in order to utilise diverse expertise and avoid overlap. Some of these initiatives are:

* IEA Bioenergy Task 39, with the aim of commercializing conventional and advanced liquid biofuels
* Biofuture Platform, which is a 20-nation country-led coalition whose mission is to “accelerate the transition to an advanced, global bioeconomy”
* Mission Innovation Sustainable Biofuels Innovation Challenge, which “aims to accelerate biofuels research, development, and demonstration in order to achieve performance breakthroughs and cost reductions with the potential to substantially lower GHG emissions”[[11]](#footnote-11)
* Below 50, an international private sector-led collaboration aiming to increase demand for sustainable fuels for transport that have less than 50 percent of the GHG emissions of fossil fuels

**Potential Scope of Work**

A possible Advanced Biofuels Activity Group could have the following scope:

1. Push forward the voluntary pilot implementation of the GBEP Sustainability Indicators (GSIs) in key commercial and pilot advanced biofuels projects within the sector, possibly in collaboration with other initiatives, in order to aid the swift development of sustainable options for feedstock, efficiency of technology deployed and the adoption of biofuels by consumers. This piloting is subject to availability of funding and willingness of private sector. The GSIs could be used as a tool to identify and assess both potential benefits and risks associated with advanced biofuels and thus inform decision-making. This would help promote feedstocks and technologies that meet carbon reduction targets compared with fossil alternatives, whilst ensuring that they contribute to meeting the SDGs.
2. Collaborate with the GBEP Task Force on Sustainability (TFS) to identify and include aspects relevant to advanced biofuels production into the Implementation Guide on GSIs. This could be conducted through seminars, conferences and other working sessions.
3. In collaboration with related efforts, focus on the relationship and potential integration between conventional biofuels and advanced biofuels technologies and business models, to improve the viability and uptake of advanced biofuel technologies. This could include a dialogue between public and private sector on economic and non-economic barriers faced by the advanced biofuels sector and ways to remove or at least reduce such barriers, including a discussion on a fair taxation system among different biofuels based on sound science, among other things. This could incorporate a discussion concerning whether and how externalities will be accounted for in the debate.

Deliverables could include:

* A workshop back-to-back with GBEP regular meetings in November 2017 to discuss ways that GBEP can contribute to ensuring advanced biofuels meet their potential to enhance the low-carbon economy in line with the UNFCCC Paris Agreement.
* In collaboration with related efforts, a workshop could be organized and a report prepared in order to address the topic of the relationship and potential integration between the first generation biofuels and advanced biofuels technologies and business models. It would be particularly interesting to display good practices/success stories and identify effective policy instruments to foster the aforementioned integration and promote the uptake of advanced biofuels technologies.
* A workshop to identify barriers to market-uptake of advanced biofuels technologies. This could showcase, and be informed by the results and outcomes of, a number of projects the GBEP members are already carrying out. An initial example could be the EC-funded FORBIO project[[12]](#footnote-12) that FAO is currently carrying out, and other project suggestions from Partners and Observers are anticipated and welcomed.

This Activity Group should be led by a GBEP Partner or Observer. The role of the AG leader is to contribute to the coordination of the work of the AG, starting from the discussion and definition of the Scope of Work, to participate in the organization of meetings and events, to chair and moderate the discussions during said events, and to report to the GBEP WGCB on the implemented activities. ***The activities proposed above represent potential opportunities for GBEP to contribute to the advanced biofuel sector and should be seen as a list from which activities can be selected depending on available funding***.

1. P. 10 ftp://ftp.fao.org/docrep/fao/011/i0100e/i0100e.pdf [↑](#footnote-ref-1)
2. P. 11 ftp://ftp.fao.org/docrep/fao/011/i0100e/i0100e.pdf [↑](#footnote-ref-2)
3. P. 12 http://www.irena.org/DocumentDownloads/Publications/IRENA\_Innovation\_Outlook\_Advanced\_Liquid\_Biofuels\_2016.pdf [↑](#footnote-ref-3)
4. https://www.iea.org/topics/renewables/subtopics/bioenergy/ [↑](#footnote-ref-4)
5. https://www.epa.gov/renewable-fuel-standard-program/final-renewable-fuel-standards-2017-and-biomass-based-diesel-volume#rule-history [↑](#footnote-ref-5)
6. P. 2 http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L1513&from=EN [↑](#footnote-ref-6)
7. For instance, the IEA Roadmap “envisions that by 2050, 32 exajoules of biofuels will be used globally, providing 27% of world transport fuel”

   P. 1 http://www.iea.org/publications/freepublications/publication/Biofuels\_Roadmap\_WEB.pdf [↑](#footnote-ref-7)
8. https://www.ipcc.ch/report/ar5/ [↑](#footnote-ref-8)
9. P. 25 http://unctad.org/en/PublicationsLibrary/ditcted2015d8\_en.pdf [↑](#footnote-ref-9)
10. P. 29 http://unctad.org/en/PublicationsLibrary/ditcted2015d8\_en.pdf [↑](#footnote-ref-10)
11. http://mission-innovation.net/our-work/innovation-challenges/sustainable-biofuels-challenge/ [↑](#footnote-ref-11)
12. http://www.forbio-project.eu/ [↑](#footnote-ref-12)